# A REVISION OF THE FLOWER BUGS (HETEROPTERA ANTHOCORIDAE) OF THE AUSTRALIAN AND ADJACENT PACIFIC REGIONS —PART III

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Fig. 1

## Genus **Poronotellus** Kirkaldy, 1904

*Poronotellus* Kirkaldy, 1904: Entomologist, 37 (498), 280. Zimmermann, 1948: Insects of Hawaii 3, 179.

*Poronotus* Reuter, 1871: Ofv. Vet. Akad. Forh., 562. Champion, 1900. Biol. Centr. Amer. Rhynch., 2, 33.

*Buchananiella* Reuter, 1885: Act. Soc. Sci. Fenn., 14, 114 & 126. (668 & 680).

*Cardiastethus* (in part) White, 1879: Ent. Mon. Mag., 16, 142.

Body oblong, pubescent, head longer than the width between the eyes. Rostrum just reaching base of anterior coxae. Posterior margin of pronotum deeply sinuate, lateral margins almost straight. The channel of the scent gland reaching middle of pleurae, straight or directed posteriad apically. Can be easily distinguished from *Cardiastethus* on the shape of the scent canal and by the shorter rostrum.

This genus could not be included in Part II because at that stage it was not clear how many species were involved in these regions. The position is still not as clear as the author would like but it seems preferable to consider that there are only two very variable species concerned, *P. whitei* in Australia and New Zealand and *P. sodalis* in the Pacific Islands.

## **Poronotellus sodalis** (White) 1878

Fig 1A

*Cardiastethus sodalis* White, 1878: A.M.N.H., (5) 1, 372.

*Buchananiella sodalis* Reuter, 1885: Act. Soc. Sci. Fenn., 14, 127 (681).

*Poronotellus sodalis* Zimmerman, 1948: Insects of Hawaii, 3, 179.

'A reddish brown *Cardiastethus*, clothed with pale hairs; eyes and posterior lobe of the pronotum piceous; antennae, legs and elytra yellowish brown; the apex of the clavus and especially the cuneus apically, brownish fuscous; the apex of the second, the third and fourth segments of the antennae, the head between the eyes and the membrane fuscous. Length about 2½ mm.

(Translated from White's Latin description.)

'Oblong, piceous ferruginous, with a low pallid pubescence; rostrum, antennae, legs and the hemelytra yellowish testaceous, on the latter the clavus towards the apex and the cuneus fuscous membrane infuscated, veins fairly weak; rostrum only attaining the base of the anterior coxae; the sides of the pronotum strongly narrowed towards the apex, straight but very lightly curved just before the apex, the posterior part a little impressed in the middle, the rima orificiorum of the metastethium shortly curved backwards at the apex, the longitudinal lateral keel is almost straight and fairly remote from the apex of the rima. Length 2½ mm.'

'It is distinguishable from the following two species' (i.e. *corlinua* and *whitei*) 'in that the sides of the pronotum are less distinctly curved before the apex, the disc is obsoletely impressed in the middle posteriorly, the rostrum is somewhat shorter and the different structure of the orifice of the metapleura. The body is oblong piceous ferrugineous, with a very low pale pubescence. The head is piceous ferrugineous, as long as wide (with the eyes), as long in front of the eyes as an eye, frons (male) a little wider than an eye. Rostrum pale yellowish testaceous reaching only to base of the anterior coxae, second segment hardly surpassing the head. Antennae yellowish testaceous, second segment apically a little more darkened, a little shorter than the width of the head with the eyes. Pronotum piceous ferrugineous, about twice as wide basally as the median length, the apical annulus tenuous but distinct, sides straight but lightly curved a little in front of the apex, the lobe outside of the callus fairly narrow, the callus posteriorly and laterally demarcated by distinct impressions, the posterior disc in the middle a little or hardly impressed, flattish. Scutellum piceous ferrugineous, medially impressed. Hemelytra testaceous, lightly shining, clavus towards the apex and the cuneus fuscous. The embolium apically about half the width of the apex of the corium, the inner suture becoming evanescent towards the apex but there is a strongly impressed longitudinal line going right to the apex, lateral margin straight; on the membrane the veins are very low. The mesopleurae are densely and lightly transversely striate. Legs yellowish testaceous, almost smooth.' (Translated from Reuter's Latin descriptions in his "Monographia".)

A series of specimens in the South Australian Museum collections from Fiji are referable to this species which seems to be fairly widely distributed in the Pacific. From them the following standard measurements have been obtained:—

*Head.* Length, 260-390; length in front of eyes, 90-140; length behind eyes, 50-100; length of eyes, 140-210; width across eyes, 310-400;

width of eyes, 90-210; interocular, 70-150; width of collum, 280-350.
*Antennae.* I, 70-110; II, 200-320; III, 140-200; IV, 160-260.
*Rostrum.* I, 70-110; II, 170-270; III, 160-220.
*Pronotum.* Anterior width, 310-390; posterior width, 670-830; median length, 220-330; lateral length, 350-480.
*Scutellum.* Anterior width, 410-540; median length, 290-430; lateral length, 330-410.

| Legs | coxa | femur | tibia | tarsi I | II | III | cl. |
|---|---|---|---|---|---|---|---|
| I | 170-260 | 400-400 | 300-400 | 30-40 | 40-50 | 50-90 | 30 |
| II | 150-220 | 310-410 | 320-430 | 30-40 | 30-50 | 70-90 | 30 |
| III | 170-220 | 400-500 | 520-620 | 30-50 | 50-90 | 70-120 | 30-40 |

Total length, 1770-2190; total width, 670-870; length abdomen, 870-1,070; length male genitalia, 190-340; length female genitalia, 120-140.
*Loc.* Distributed widely over the Pacific Islands, the species was first described from Hawaii. The specimens in the South Australian Museum are all from Fiji; Viti Levu (A. M. Lea).

**Poronotellus whitei** (Reuter), 1885.

**Fig. 1B**

*Buchananiella whitei* Reuter, 1885: Act. Soc. Sci. Fenn 14, 127 & 129 (681 & 683),

'Oblong, obscurely yellowish testaceous, with low yellowish pubescence, shining, hemelytra darker, cuneus infuscated, membrane smoky, the basal angle interiorly and the base of the veins sordid yellow, the latter all distinct, well elevated, antennae and legs pale yellowish, the second segment of the antennae fairly broadly infuscated; rostrum reaching the anterior coxae, the disc of the pronotum distinctly impressed in the middle. Length (male) 2 mm.
*Habitat.* Tasmania, D. Schayr. (Berlin Museum).

Very similar and closely allied to *B. continua* but differing somewhat in the slightly smaller size, and the more dilute colour. Body more darkly yellowish testaceous or almost ferruginous, shining. Head as long as the pronotum, length in front of eyes not much more than length of an eye. Rostrum just attaining the anterior coxae, pale yellowish, first segment blackish. Antennae pale yellow, first segment testaceous, the second as long as the head between the eyes and the apex, the apical 2/5 blackish (last missing in the example). Pronotum apically 2/3 narrower than at the base, apical annulus very distinct, callus fairly elevated, posterior disc more obsoletely punctate, basally deeply sinuate, lateral margins completely straight; all more obscurely yellowish testaceous or almost ferruginous. Scutellum almost ferruginous. Hemelytra

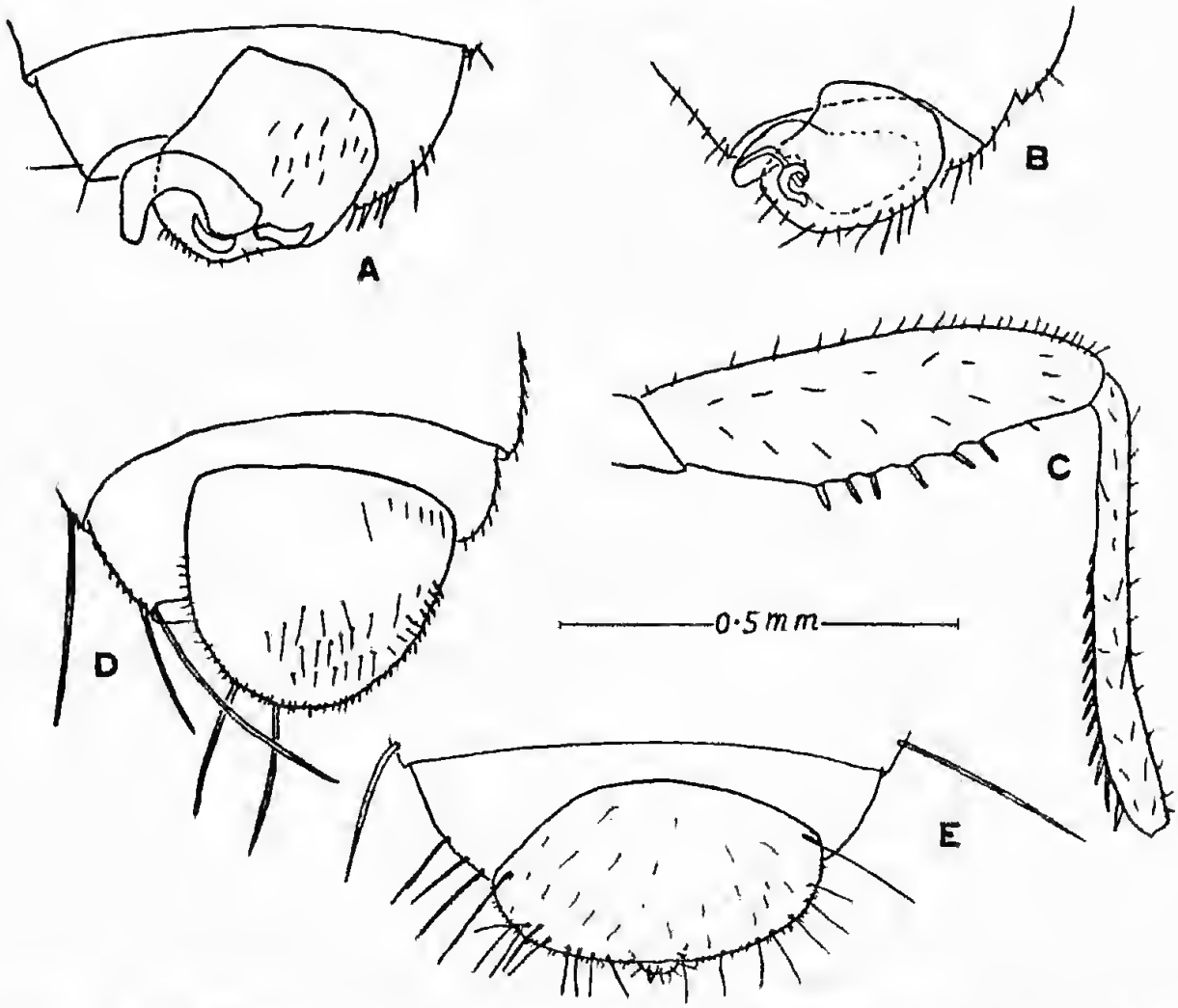


Fig. 1. A. *Poronotellus sodalis* (White); male genitalia. B. *Porontellus whitei* (Reuter); male genitalia C. *Oplobates woodwardi* sp. nov.: female, fore femur and tibia. D. *Lasiellidea glaberrima* Reuter; male genitalia. F. *Scoloposcelis parallelus* (Motsch); male genitalia.

darkish yellow, testaceous, almost flat with a fairly dense low pubescence, the exterior margin and the exterior puncture more deeply coloured to the apex of the corium; membrane smoky, veins basally and the inner angle paler, all the veins very distinct but more obsolete apically, the common areola of the two inner veins a little shorter than the basal space of the membranal suture between the base of the third vein and the internal angle of the membrane. Sternum and abdomen ferruginous, mesosternum laterally punctulate, ventrally and apical margin of the segments more or less blackish. Legs completely pale yellow, fairly smooth.'

(Translated from Reuter's Latin description in his "Monographia.")

All the Australian specimens of this genus and the two New Zealand ones available to me for study seem to belong to this species. From them the following standard measurements have been obtained.

*Head.* Length 380-500; length in front of eyes, 120-170; length behind eyes, 50-120; length of eyes, 170-220; width across eyes, 350-430; width of eyes, 120-170; interocular, 90-150; width of collum, 280-380.

*Antennae.* I, 80-120; II, 270-400; III, 160-210; IV, 190-260.

*Rostrum.* I, 70-140; II, 180-290; III, 160-210.

*Pronotum.* Anterior width, 290-400; posterior width, 710-930; median length, 260-350; lateral length, 410-530.

*Scutellum.* Anterior width, 380-620; median length, 360-500; lateral length, 360-510.

| Legs | coxa | femur | tibia | tarsi I | II | III | cl. |
|---|---|---|---|---|---|---|---|
| I | 190-300 | 380-500 | 350-480 | 30-70 | 30-70 | 90-120 | 30-50 |
| II | 170-240 | 360-480 | 400-500 | 34 | 50-70 | 90-120 | 30 |
| III | 170-260 | 480-670 | 580-390 | 30-70 | 70-100 | 100-170 | 30-50 |

Total length, 2,040-2,760; total width, 760-1,050; length abdomen, 900-1,550; length male genitalia, 190-290; length female genitalia, 90-210.

*Loc.* New South Wales: Bondi near Sydney (K. K. Spence, 1 specimen), Mittagong (A. M. Lea, 2 specimens), Hornsby (C. Gibbons, 2 specimens), Gosford (2 specimens); Queensland: Cairns district (A. M. Lea, 12 specimens, one of which was attracted to light), Somerset (C. T. McNamara, 1 specimen), Mt. Tambourine (A. M. Lea, 1 specimen), 15 mi. W. of Bowen (on *Casuarina cristata* = *lepidophloea*) 24th September, 1950, (E. F. Riek, 1 specimen); Victoria: Wahringa (June 1936, 1 specimen), Grantville (6 specimens); Tasmania: Launceston (A. M. Lea, 1 specimen); Lord Howe Island (A. M. Lea, 12 specimens); New Zealand: Little Barrier Island, Hauraki Gulf (11 December, 1952, T. E. Woodward, 1 specimen); Otaki River south of Levin, Wellington Province (30 November 1951, T. E. Woodward).

The species is extremely variable both in the standard measurements where some very large ranges are recorded and in the colours noted. On the measurements no consistent group could be detailed, a specimen having a very high or low reading on one measurement would lie very near the average in most others, or a series of specimens all from the same restrictive locality (e.g. Lord Howe Island) often give the same extreme range as I have quoted for the whole species.

Because of this and the great variety of colour variants one is tempted to suggest that the species is in process of breaking up into a series of subspecies and that as yet definite groups have not appeared.

Another noteworthy feature about the species is that out of about 40 examples studied, only four were males.

Material belonging to genera and species dealt with in parts I and II of the present series but examined subsequently.

## Subfamily ANTHOCORINAE

### Orius australis (China), 1926

*Orius australis* (China), *synon.* Gross, 1954: Rec. S. Austr. Mus., 11 (2), 136-7.

A new series of females have been measured since this species was mentioned in Part I and the consequent extensions to the range of the standard data are:—

*Head.* Total length, 320-380; length in front of eyes, 80-140; length behind eyes, 50-70; length of eyes, 160-180; width of head across eyes, 380-410; width of eyes, 90-120; interocular, 140-190; width of collum, 310-400.

*Antennae.* I, 70-100; II, 200-220; III, 150-190; IV, 160-220.

*Rostrum.* I, 70-90; II, 240-270; III, 155-160.

*Pronotum.* Anterior width, 330-420; posterior width, 690-810; median length, 270-350; lateral length, 400-450.

*Scutellum.* Anterior width, 530-560; median length, 350-410; lateral length, 400-460.

| Legs | coxa | femur | tibia | tarsi I | II | III | cl. |
|---|---|---|---|---|---|---|---|
| I | 270 | 350-390 | 350-360 | 40 | 70 | 70-80 | 40-50 |
| II | 220-230 | 350-390 | 340-360 | 30-40 | 50-70 | 80-90 | 40 |
| III | 220-260 | 430-480 | 520-600 | 50 | 80-90 | 80-90 | 40 |

Total length, 1,980-2,250; total width, 690-380; length abdomen, 960-1,290; length ovipositor, 380-570.

*Habitat.* Queensland: the measured specimens are from a large series of specimens from Carnarvon Gorge, 29 May, 1954; St. Lucia, 30 May, 1951; Tibrogargan Creek, 4 September, 1953; Toorbul Point, 11 August, 1952; and Gratton (by sweeping), 4 March, 1954, all collected by T. E. Woodward, University of Queensland.

### **Orius armatus** Gross, 1954

*Orius armatus* Gross, 1954: Rec. S. Austr. Mus., 11 (2), 137-8.

One more specimen, unfortunately lacking the abdomen, has been measured and the alterations to the previously quoted ranges of the standard data are:—

*Head.* Length behind eyes, 50-90; length of eyes, 140-190; width of head across eyes, 360-400; interocular, 130-160; width of collum, 300-360.

*Antennae.* II, 200-230; III, 170-190.

*Rostrum.* II, 180-220; III, 150-170.

*Pronotum*. Anterior width, 330-400; median length, 270-290; lateral length, 360-400.

*Scutellum*. Anterior width, 480-530.

| Legs | coxa | femur | tibia | tarsi I | II | III | cl. |
|---|---|---|---|---|---|---|---|
| I | 120-210 | 330-380 | 310-360 | 40 | 70 | 70 | 30 |
| II | 170-180 | 330-360 | 320-360 | 40-50 | 60-90 | 70 | 30 |
| III | 200-210 | 420-470 | 480-520 | 40 | 50-90 | 90 | 30 |

The specimen is from Queensland: Carnarvon Gorge, 29 May, 1954, T. E. Woodward. Woodward Collection.

*Anthocoris arctatus* (Walker, 1872: Cat. Hem. Het., 5, 153) is actually an *Oxycarenus* (Lygaeidae) according to distant 1904 (A.M.N.H., (7) 14, 22).

## Subfamily LYCTOCORINAE

### Genus **Falda** Gross, 1954

*Falda* (Gross), 1954; Rec. S. Austr. Mus., 11 (2), 139) definitely is not an Anthocorid but belongs rather to the very closely allied Prostemminae, usually considered as a subfamily of the Nabidae. Carayon 1950 (Bull. Mus. Hist. Nat., (2) 22 (1), 95-101) has emphasised afresh the very close relationships of the Nabidae, particularly the Prostemminae, to the Cimicoid group of families. In appearance some of the smaller species are exceptionally like Anthocorids and it was this very close resemblance that led the author to first place this species as an Anthocorid. His attention was drawn to its true position by Dr. Carayon.

It is probably synonomous with *Alloeorhynchus* Fieber and *F. queenslandica* may in fact be *A. flavolimbatus* Kirkaldy, 1907 (Proc. Linn. Soc. N.S.W., 32, 781) although Kirkaldy's description is not sufficiently good to determine this.

### **Oplobates woodwardi** sp. nov.

Fig. 1C

Elongate, shining, piceous. Rostrum would surpass somewhat the base of the head (if complete). Eyes fairly prominent with a long hair in front on each side. Collum well defined. Pronotum fairly rectangular but anterior angles not well marked, collar distinct but tenuous. Sides of pronotum with very fine ciliations and with a long hair at each posterior angle and one behind each apical angle. Fore and hind margins concave.

Hemelytra surpassing somewhat the apex of the abdomen which is equipped with some long hairs. A well developed ovipositor present. Fore femora slightly enlarged with six large teeth (30 u) fairly centrally placed on the inner margin. Fore tibiae slightly curved.

The standard measurements from the one female are:—

*Head.* Total length, 570; length in front of eyes, 210; length behind eyes, 90; length of eyes, 240-260; width across eyes, 480; width of eyes, 140; interocular, 220; width of collum, 360.

*Antennae.* I, 140; II, 500; rest missing.

*Rostrum.* I, 140; II, 400; last segment missing.

*Pronotum.* Anterior width, 380; posterior width, 770; median length, 330; lateral length, 500.

*Scutellum.* Anterior width, 600; median length, 470; lateral length, 380.

| Legs | coxa | femur | tibia | tarsi I | II | III | cl. |
|---|---|---|---|---|---|---|---|
| I | 410 | 550 | 550 | — | — | — | — |
| II | — | 520 | 520 | 30 | 70 | 120 | — |
| III | — | 620 | 810 | — | — | — | — |

Total length, 2,930; width across abdomen, 950; length abdomen, 1,030; length ovipositor, 550.

This species is easily distinguished from *O. femoralis* Reuther by its smaller size, more slender build, and longer more centrally situated teeth on the femora.

*Loc.* Queensland: Brisbane (T. E. Woodward, 1954, Holotype, Female, Reg. No. I 20,085) in the Department of Entomology, University of Queensland.

**Lasiochilus derricki** Gross, 1954

*Lasiochilus derricki* Gross, 1954: Rec. S. Austr. Mus., 11 (2), 143-5.

Two more specimens of these species have become available to the author for measurement since the original description. These measurements extend somewhat the ranges quoted for the standard data as derived from the holotype and the allotype. These new ranges are:—

*Head.* Total length, 430-500; length behind eyes, 70-120; interocular, 210-260.

*Antennae.* I, 120-170; II, 330-400; III, 350-380; IV, 400-430.

*Rostrum.* I, 220-260; II, 600-690; III, 350-400.

*Pronotum.* Anterior width, 430-460; median length, 360-400; lateral length, 480-520.

*Scutellum.* Anterior width, 500-520; median length, 380-430; lateral length, 420-470.

| Legs | coxa | femur | tibia | tarsi I | II | III | cl. |
|---|---|---|---|---|---|---|---|
| I | 310-330 | 520-580 | 550-640 | 30-50 | 90-100 | 140-150 | 50 |
| II | 220-280 | 520-620 | 550-590 | 50 | 90-100 | 140 | 60-70 |
| III | 240-260 | 690-760 | 790-830 | 50-70 | 90-120 | 140-170 | 70 |

Total length, 2,760-3,480; width, 1,090-1,330; length female genitalia, 720-800.

The two measured specimens are from "leaf mould in rain forest, Blackbut, South East Queensland, 10 September, 1954, T. E. Woodward." In the Department of Entomology, University of Queensland.

**Lasiochilus vitiensis** Gross, 1954

*Lasiochilus vitiensis* Gross, 1954: Rec. S. Austr. Mus., 11 (2), 148.

Another female of this species is now available for measurement and the following extensions to the previously quoted ranges are now noted.

*Head.* Length in front of eyes, 140-170; width collum, 330-380.

*Antennae.* III, 260-280.

*Rostrum.* I, 90-100; III, 220-260.

*Pronotum.* Posterior width, 740-810; lateral length, 430-480.

*Scutellum.* Anterior width, 570-620; median length, 330-400; lateral length, 430-480.

| Legs | coxa | femur | tibia | tarsi I | II | III | cl. |
|---|---|---|---|---|---|---|---|
| I | 260-330 | 450-480 | 360-450 | Same | | | |
| II | 240-260 | 430-470 | 430-520 | Same | | | |
| III | 260-310 | 570-600 | 670-710 | Same | | | |

Total length, 2,410-2,690; width, 950-1,000; length ovipositor, 450-530.

*Loc.* The additional specimen is also from Fiji; Taveuni (May, A. M. Lea).

Subfamily DUFOURIELLINAE

**Lasiellidea glaberrima** Reuter, 1895

**Fig 1D**

*Lasiellidea glaberrima* Reuter, 1895: Ent. Mon. Mag., 31, 172. Gross, 1954: Rec. S. Austr. Mus., 11 (2), 153.

A male specimen referable to this species is now available for study. From it the following standard measurements have been obtained.

*Head.* Total length, 590; length in front of eyes, 190; length behind eyes, 100; length of eyes, 240; width across eyes, 430; width of eyes, 120-140; interocular, 190; width of collum, 350.

*Antennae.* Missing.

*Rostrum.* I, 170; II, 350; III, 260.

*Pronotum.* Anterior width, 380; posterior width, 740; median length, 360; lateral length, 470.

*Scutellum.* Anterior width, 550; median length, 400; lateral length, 430-450.

| Legs | coxa | femur | tibia | tarsi I | II | III | cl. |
|---|---|---|---|---|---|---|---|
| I and II | Missing | | | | | | |
| III | 220-280 | 640-650 | 760-770 | 30 | 90 | 140 | — |

Total length, 2,950; total width, 770; length abdomen, 1,280; length male genitalia, 290.

*Loc.* Queensland; St. Lucia, Brisbane (30 June 1951, T. E. Woodward).

**Scoloposcelis parallelus** (Motsch.), 1863

Fig. IE

*Anthocoris parallelus* Motschulsky, 1863: Bull. Soc. Mosc., 36 (3), 89.

*Scoloposcelis parallelus auctt.: syn:* Gross, 1954: Rec. S. Austr. Mus., 11 (2) 155.

Two more complete specimens are now in the South Australian Museum, both are from Rossel Island, Papua, H. K. Bartlett. One of these is a male and the genitalia are now figured for comparison with those of other genera.

**Cardiastethus aridimpressus** Gross, 1955

*Cardiastethus aridimpressus* Gross, 1955: Rec. S. Austr. Mus., 11 (4), 412-413.

There is a misprint on page 412 in the standard data given for this species. The measurements for antennal segment I are of course 90-100, not as quoted 900-1,000.

**Cardiastethus lincolnensis** Gross, 1955

*Cardiastethus lincolnensis* Gross, 1955: Rec. S. Austr. Mus., 11 (4), 413.

Another specimen collected by Lea from the holotype locality has since become available to the author and the measurements derived from this specimen extend somewhat several of the ranges quoted in the standard data for the species as derived from only four specimens. The new ranges are:—

*Rostrum.* I, 90-170.

*Pronotum.* Anterior width, 400-520.

*Scutellum.* Anterior width, 520-590.

*Legs.* Femur I, 480-520; femur III, 630-690; tibia III; 670-740; tarsus III, I, 30-50; tarsus III, II, 80-90; tarsus III, III, 100-120.

Total length, 2,070-3,190.

Measured specimen from Pt. Lincoln, South Australia. A. M. Lea (Reg. No. I. 20,084) in the South Australian Museum.

## REFERENCES

Carayon, J., 1950: Bull. Mus. Hist. Nat., 2 (22), 1, 95-101.

Champion, G. C., 1900: Biol. Centr. Amer, Rhynch., 2, 306-335.

China, W. E. and Myers, J. G., 1929: A. M. N. H., 10 (3), 97-125.

China, W. E., 1926: Bull. Ent. Res., 17 (1), 361-362.

China, W. E., 1933: A.M.N.H., 10 (11), 514-518.

Condon, H. T., 1954: S. Aust. Ornith., 21, 17-27 and 41-44.
Cookson, I., 1953a: Aust. J. Bot., 1 (1), 64.
Cookson, I., 1953b: Aust. J. Bot., 1 (3), 462-472.
Cookson, I., 1954: Aust. J. Bot., 2 (1), 52-58.
Cookson, I. and Pike, K. M., 1953a: Aust. J. Bot. 1 (1), 71-82.
Cookson, I. and Pike, K. M., 1953b: Aust. J. Bot. 1 (3), 474-482.
Cookson, I. and Pike, K. M., 1954: Aust. J. Bot., 2 (1), 60-68.
Crocker, R. L. and Wood, J. G., 1947: Trans. Roy. Soc. S. Aust., 71, 91-136.
Distant, W. L., 1904: A.M.N.H., 7 (14), 220-222.
Distant, W. L., 1906: Fauna British India (Rhynchota), 3, 4-3 (London.)
Distant, W. L., 1910: Fauna British India (Rhynchota), 5, 295-309 (London).
Dufour, L., 1831: Ann. Soc. Ent. France, 2, 104-107.
Fabricus, J., 1794: Ent. Syst., 4, 75.
Fallen, C. F., 1814: Spec. Nova. Hemipt. Disp. Meth., 9.
Fieber, F. X., 1860: Wien. ent. Monats., 4, 270.
Fieber, F. X., 1864: Wien. ent. Monats., 7, 61.
Hahn, C. W., 1835: Wanz. Ins., No. 3, 19-20.
Gross, G. F., 1954: Rec. S. Aust. Mus., 11 (2), 129-164.
Gross, G. F., 1955: Rec. S. Aust. Mus., 11 (4), 409-422.
Kirkaldy, G. W., 1902: In David Sharp's Fauna Hawaiiensis, 127 (Cambridge).
Kirkaldy, G. W., 1904: Entomologist, 37 (498), 280.
Kirkaldy, G. W., 1907: Proc. Linn. Soc. N.S.W., 32, 781.
Kirkaldy, G. W., 1908: Proc. Linn. Soc. N.S.W., 33, 374-375.
Lethierry, L., and Severin, G., 1896: Cat. Gen. Hem., 3, 237-252 (Brussels).
Motschulsky, 1863: Bull Soc. Mosc., 36 (3), 89.
Poppius, B., 1909: Act. Soc. Sci. Fenn., 37 (9), 1-43.
Poppius, B., 1910: Wien. ent. Zeit., 29, 140.
Puton, A., 1886: Cat. Hem. Faunc Pal., 43 (3rd Edition).
Reuter, E., 1871: Oefv. Vet. Akad. Forh., 562.
Reuter, E., 1875: Bihang till S.V.A.K. Handh., 3 (1), 65.
Reuter, E., 1885: Act. Soc. Sci. Fenn., 14, 555-756 (1-201).
Reuter, E., 1895: Ent. Mon. Mag., 31, 170-172.
Spencer, B., 1896: Rept. Horn Scient. Exped. to Central Australia, 1, 196-199.
Tate, R., 1889: Aust. Ass. Adv. Sci., 1, 312-325.
Tate, R., 1890: Handbook of the Flora of Extratropical South Australia. (Adelaide).
Tindale, N. B., 1947a: Rec. S. Aust. Mus., 8 (4), 616-617.
Tindale, N. B., 1947b: *Loc. cit.*, 619-652.
Tindale, N. B., 1949: *Loc. cit.*, 9 (2), 143-154.

Tindale, N. B., 1952: Trans. Roy Soc. S. Aust., 75, 25-29.

Usinger, R. L., 1946: Bernice P. Bishop Mus. Bull., 189, 55.

Van Duzee, E. P., 1917: Cat. Hem. Nth. Mexico, 287-297 (Berkely, California). Issued as Univ. of Cal. Pubs. Bulls., Coll. Agr., Agric., Expt. Stn., Entomology, 2.

Walker, F., 1872: Cat. Het., 5, 148-161.

White, F. B., 1877: A.M.N.H., 4 (20), 111.

White, F. B., 1878: A.M.N.H., 5 (1), 372.

White, F. B., 1878: Ent. Mon. Mag., 15, 159.

White, F. B., 1879: Ent. Mon. Mag., 16, 142-148.

Wolff, J. P., 1811: Icon. Cim., 5.

Zimmerman, E., 1948: Insects of Hawaii, 3, 169-179 (Honolulu).